

melting snow, in connection with ice gorges in streams, caused floods in Westchester Co., N. Y., on the 10th; in west New England, east New York, and east Pennsylvania on the 11th and 12th; and in west Massachusetts, Connecticut, east New York, and east Pennsylvania on the 22d. Vegetation was re-

ported damaged by drought at San Diego and Santa Cruz, Cal., and the month was very dry at Eola, Oregon, Mount Carmel, Utah, Farley's Camp, Ariz., and Fayette, Mo. On the 5th Green Bay was frozen at Green Bay., Wis., and on the 7th the lake was frozen at Port Huron, Mich.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for January, 1891, as determined from observations taken daily at 8 a. m. and 8 p. m. (75th meridian time), is shown on Chart II by isobars. The departure of the mean pressure for January, 1891, obtained from observations taken twice daily at the hours named, from that determined from hourly observations, varied at the stations named below, as follows:

Station.	Departure.	Station.	Departure.
New Orleans, La.	+ .001	Washington City.....	+ .011
Cincinnati, Ohio.....	+ .004	Philadelphia, Pa.....	+ .012
Duluth, Minn.	+ .005	Saint Louis, Mo.....	+ .001
Memphis, Tenn.....	+ .005	Galveston, Tex.....	+ .003
Cleveland, Ohio.....	+ .007	Salt Lake City, Utah.....	+ .008
Chicago, Ill.....	+ .007	Santa Fe, N. Mex.....	+ .008
Savannah, Ga.....	+ .007	Denver, Colo.....	+ .008
Buffalo, N. Y.....	+ .008	Fort Assiniboine, Mont.....	+ .013
Eastport, Me.....	+ .008	Portland, Oregon.....	+ .015
New York City.....	+ .010	San Francisco, Cal.....	+ .010
Boston, Mass.....	+ .010	San Diego, Cal.....	+ .020

The mean pressure was highest over adjoining parts of the middle and northern plateau regions, where it was above 30.30, whence it decreased eastward to below 29.95 over east Nova Scotia and Cape Breton Island, southeastward to about 30.15 over the Gulf States, southward to below 30.10 over the southwest part of the southern plateau and on the south Pacific coast, westward to about 30.20 on the middle Pacific coast, and northwestward and northward to below 30.10 on the extreme north Pacific coast and over the British Northwest Territory. A remarkable feature of the month was the high

pressure over the middle plateau, where the mean was about .05 higher than previously noted for January within the limits of the United States.

A comparison of the pressure chart for January with that of the preceding month shows that east of a line traced from the Lake region to the southern plateau, save in Maine and the Canadian Maritime Provinces, there was a general decrease in mean pressure, and that to the westward of this line, and east of the 70th meridian, there was an increase in pressure. The most marked decrease in pressure occurred in the middle and lower Mississippi valleys and along the west Gulf coast, where it exceeded .05, and the greatest increase in pressure occurred on the north Pacific coast and at Cape Breton Island, where it was more than .15. The position of the area of highest pressure over the plateau region shifted somewhat to the northwest, with an increase of about .05 in included mean values.

The mean pressure was above the normal west of the 100th meridian, and to the eastward of that meridian it was below the normal, except over south Florida. The most marked departure above the normal occurred over the plateau region north of the 40th parallel and thence to the north Pacific coast, where it exceeded .10, and the greatest departure below the normal occurred from the middle Mississippi valley eastward to the middle Atlantic and south New England coasts, and in the interior of the Gulf States, where it was more than .05.

The monthly barometric ranges at regular stations of the Signal Service are shown in the table of Signal Service data on the last two pages of the REVIEW.

Tabulated statement showing principal characteristics of areas of high and low pressure.

Barometer.	First observed.			Last observed.			Duration.	Velocity per hour.	Maximum pressure change and maximum abnormal temperature change in twelve hours and maximum wind velocity.									
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.			Station.	Rise.	Date.	Station.	Fall.	Date.	Station.	Direction.	Miles per hour.	Date.
High areas.										Inch.								
I.....	1	48	102	5	50	63	4.0	29	Rockliffe, Ont.....	.86	2	Buffalo, N. Y.....	27	2	Port Huron, Mich.....	nw.	28	3
II.....	4	52	98	11	40	69	6.5	16	Albany, N. Y.....	.24	8	Father Point, Quebec.....	22	8	Port Arthur, Ont.....	nw.	24	5
III.....	12	30	102	15	39	71	3.5	29	do.....	.60	15	Northfield, Vt.....	25	15	Toledo, Ohio.....	n.	28	14
IV.....	14	54	114	17	46	59	3.0	36	Huron, S. Dak.....	.66	15	Kingston, Ont.....	40	16	Anticosti Island, G. S. L.....	nw.	28	16
V.....	16	39	110	20	31	78	4.0	21	Parkersburg, W. Va.....	.22	18	Nashville, Tenn.....	11	17	Cheyenne, Wyo.....	nw.	32	16
VI.....	22	26	84	24	44	64	2.0	36	Boston, Mass.....	.48	23	Raleigh, N. C.....	19	22	Sydney, C. B. I.....	sw.	30	24
VII.....	23	28	101	27	32	75	4.0	16	Nantucket, Mass.....	.60	25	Montgomery, Ala.....	17	24	Eastport, Me.....	ne.	16	27
VIII.....	25	50	92	27	47	59	2.0	32	Anticosti Island, G. S. L.....	.26	26	Quebec, Quebec.....	24	26	Montreal, Quebec.....	ne.	16	26
IX.....	29	38	101	31	43	62	2.0	44	Yarmouth, N. S.....	.56	31	Keokuk, Iowa.....	18	29	Nantucket, Mass.....	nw.	38	31
Mean.....							3.4	29		.50			23				27	
Low areas.										Fall.			Rise.					
I.....	1	40	91	3	46	59	2.0	36	Rockliffe, Ont.....	.52	1	Father Point, Quebec.....	32	2	Grand Haven, Mich.....	n.	48	2
II.....	4	33	79	7	45	63	3.0	17	Yarmouth, N. S.....	.54	5	Chatham, N. B.....	16	5	Eastport, Me.....	ne.	48	5
III.....	6	30	107	13	47	58	7.5	20	Portland, Me.....	.96	12	Atlanta, Ga.....	22	11	Block Island, R. I.....	sw.	60	12
IV.....	12	49	115	15	49	65	3.0	35	Minneapolis, Man.....	.94	12	Moorhead, Minn.....	40	13	Fort Assiniboine, Mont.....	sw.	48	12
V.....	14	33	105	20	49	59	6.5	22	Boston, Mass.....	.50	17	Sydney, C. B. I.....	21	18	Block Island, R. I.....	ne.	48	17
VI.....	15	49	126	19	44	78	4.5	24	Minneapolis, Man.....	.56	16	Valentine, Nebr.....	31	16	Fort Assiniboine, Mont.....	sw.	52	16
VII.....	17	53	117	23	50	61	6.0	24	White River, Ont.....	.34	20	Swift Current, N. W. T.....	36	17	Montreal, Quebec.....	sw.	60	23
VIII.....	22	30	107	26	48	53	4.0	38	Nantucket, Mass.....	.80	25	Chattanooga, Tenn.....	13	23	Block Island, R. I.....	ne.	72	25
IX.....	23	52	116	28	42	69	4.0	25	Prince Albert, N. W. T.....	.46	23	Fort Assiniboine, Mont.....	25	23	Valentine, Nebr.....	nw.	36	24
X.....	25	53	119	27	49	87	2.5	30	Bismarck, N. Dak.....	.28	26	Des Moines, Iowa.....	14	26	Fort Assiniboine, Mont.....	sw.	36	25
XI.....	26	42	112	31	48	53	4.5	33	Halifax, N. S.....	.72	30	Chatham, N. B.....	18	30	El Paso, Tex.....	w.	48	27
XII.....	29	53	110	31	43	85	2.5	24	Swift Current, N. W. T.....	.48	29	Nashville, Tenn.....	25	31	Winnipeg, Man.....	ne.	40	30
Mean.....							4.2	27		.59			24				50	

AREAS OF HIGH PRESSURE.

During the month of January there was an area of marked high pressure in the region to the west of the Rocky Mountains. As will be seen by Chart II the isobar of 30.30 covers an extended region and includes a pressure of 30.35 at Winnemucca, Nev., where the highest mean January pressure previously ob-

served was 30.26 in 1889. This permanency of high pressure in the plateau region had a very important bearing upon the weather of the entire country, causing high temperature in nearly all districts. Only one High from the Northwest Territory passed over this country. It may be considered that the Rocky Mountains formed a barrier to the progress of these

Highs eastward and the only one that came from this region, V, had the least magnitude of all those charted and caused a maximum fall of only 11° during its progress. A general idea of the characteristics of these Highs may be found in the table at the beginning of this description, and the following details are given of the individual cases noted:

I.—On the first day of the month this High of slight magnitude was situated in North Dakota; it moved slowly south for a day and then turned to the northeast, disappearing in the Gulf of Saint Lawrence on the 5th. As it approached the coast it increased in magnitude and caused a widespread cold area along the coast, with the lowest temperature of the month. The temperature reached -12° at Northfield, Vt., a. m. of 4th.

II.—This High was first noted in Manitoba p. m. of 4th. It moved very slowly in an east-southeast course and passed off the middle Atlantic coast a. m. of 11th. The highest pressure of the month (30.76) east of the Rocky Mountains was observed at Green Bay, Wis., during its passage a. m. of 8th. The pressure steadily fell from this date to the 11th, reaching 30.24 at Washington City p. m. of 10th.

III.—Beginning with the 9th and continuing 5 days the pressure was abnormally high in the plateau region each day, reaching 30.76 at Winnemucca, Nev., on the 12th. From this a tongue of high pressure appeared reaching into Texas, which formed this High a. m. of 12th. It passed east to the eastern Gulf and then northeast, passing off the New Jersey coast on the 15th.

IV.—On the morning of the 14th this High seemed to come down to the north of Montana. From there it moved nearly east, passing off Nova Scotia on the 17th. The lowest temperature of the month in the Northwest occurred during the passage of this High, at Saint Vincent, -27° .

V.—This was the only High of the month that came directly from the plateau region. On the a. m. of the 16th the area of high pressure in this region showed a slight movement toward the east and a portion of it was cut off and moved east as a distinct High, merging with the Atlantic high area on the 20th.

VI.—It is probable that this High was in the west Gulf on the a. m. of the 22d, but its first definite appearance was in the p. m. of that date in western Florida. It moved northeast along the coast and was last noted on the 24th off Nova Scotia.

VII.—This High is also a partial off-shoot from the extended high area in the plateau region. It was first noted in Texas on the 23d and moved very slowly east, merging into the Atlantic high area on the 27th. II and VII had the lowest velocity noted this month, 16 miles per hour.

VIII.—This High came down to the north of Lake Superior on the 25th. Its motion was due east, continuing most of the time in Canada. It passed over Newfoundland on the 27th.

IX.—On the 26th there were evidences of a high area of some magnitude off the middle Pacific coast. This moved very slowly northward but did not come upon the land. On the a. m. of the 29th a tongue of high pressure shot out from this high area, extending from the north Pacific coast to Texas, and in the afternoon this High was separated off. It moved very rapidly (44 miles per hour) ene. and was last noted off Nova Scotia, afternoon of the 31st.

AREAS OF LOW PRESSURE.

An examination of Chart I, which shows the paths of all storms during this month, will show that the general tendency of the storms has been toward the northeast, 9 out of the 12 storms having disappeared near Nova Scotia. This general tendency of the storms has been due in part to the position of the permanent area of high pressure in the Atlantic, which has been near the south Atlantic coast. The pressure at Bermuda has been nearly .10 above the normal. This is also, in part, an explanation of the general high temperature east of the Mississippi. Only one of the storms originated in the Pacific, five in the region to the north of Montana, three in or very near Texas, one in Utah, and one off the South Atlantic coast.

I.—This storm, XIV of the December REVIEW, had moved from Manitoba to Kansas during the last days of December. It was central in Illinois on the 1st and moved in a northeast direction, passing off the Nova Scotia coast on the 3d. This was the most extensive storm of the month. The area included within the 30.00 isobar on the a. m. of the 1st was 1,900,000 square miles and that of $\frac{1}{2}$ -inch rainfall in 12 hours was 200,000 square miles. On the p. m. of the 1st the 30.00 area included 2,500,000 square miles and the heavy rainfall had divided, there being one centre in Tennessee and another entirely distinct in Michigan. The area of $\frac{1}{2}$ -inch rainfall was 140,000 square miles.

II.—On the 4th clouds and winds indicated a disturbance of very slight intensity off the south Atlantic coast. This storm skirted the coast for 3 days and passed off Nova Scotia on the 7th.

III.—On the morning of the 6th the winds showed a very slight storm in Texas, or rather the southern extremity of a trough of low pressure extending from Montana to Texas. It had a motion east to Louisiana for 5 days and from there ne., passing off the New Brunswick coast on the 13th. On the a. m. of the 11th the area within the 30.00 isobar was 1,700,000 square miles, and that of $\frac{1}{2}$ -inch rainfall in 12 hours, 40,000 square miles. As this storm approached the Atlantic coast its dimensions were markedly increased. On the morning of the 12th it stretched in oval shape from the north of Newfoundland to the south of Florida, and east to west from the 100th meridian to Bermuda. The pressure at Portland, Me., was 28.68, which has been equalled only once before at this station, on February 2, 1876.

IV.—This storm originated in the territory to the north of Montana and the path of its centre was just on the border of the United States till it reached Maine on the 14th. It disappeared in the Gulf of Saint Lawrence on the 15th. Very slight precipitation attended its course, the largest amount in 12 hours being 0.44 at Kingston, Ont., on the 14th. The lowest pressure was 29.38, at Marquette, Mich.

V.—Clouds and winds show a slight disturbance in Texas on the 14th, and by the morning of the 15th it had moved to the Gulf. As this storm approached the Atlantic, High III had moved to the south Atlantic, causing a pressure of 30.45 at Bermuda, and this high pressure deflected the storm along the Atlantic coast. It reached Newfoundland on the 20th.

VI.—This is the only storm of the month that came from the Pacific coast, and was of slight intensity throughout. It was first noted off Washington on the 15th. It moved a little south of east and was last noted over Lake Ontario on the 19th, as on the succeeding day it was merged in VII.

VII.—A disturbance of slight intensity was noted to the north of Montana on the 17th, the appearance being as though an increasing pressure in the rear of VI had prevented its coalition with this storm. The two storms moved separately till the 20th, when they were merged in one over Lake Michigan. On the p. m. of the 20th a trough of low pressure extended from the principal locus over Michigan to the west Gulf and two days later a circular storm of great extent had developed over Pennsylvania. This storm disappeared in the Gulf of Saint Lawrence on the 23d.

VIII.—This storm developed in west Texas on the 22d and moved east to the west Gulf, then northeast to Newfoundland on the 26th. The intensity of this storm was greatly increased as it approached and passed up the coast, being deflected north by the permanent Sargossa Sea high area. Freezing weather attended this storm and a large amount of sleet and snow fell in the middle and north Atlantic states on the 25th, impeding and interrupting telegraphic communication. See "Local storms."

IX.—This storm moved down to the north of Montana on the 23d. Its course was slightly south of east, passing off the Massachusetts coast on the 27th. The lowest pressure observed was 29.70, and the greatest precipitation in 12 hours, 0.24.

X.—Like the last this storm was of very slight intensity.